

What is claimed is:

5 A method of forming a crucible comprising:

- (a) bottoming one end of a tube thereby forming a substantially closed end;
- (b) heating the closed end to a forming temperature;
- (c) contacting an interior surface of the closed end with a forming tool, thereby altering the interior surface of the closed end to form at least one section with a predetermined wall thickness; and
- (d) manipulating the at least one section of the closed end to form an orifice.

10 2. The method of claim 1, wherein said contacting comprises rotating the tube and the forming tool.

15 3. The method of claim 1, wherein said forming temperature comprises a temperature of at least a glass softening temperature for a material of construction of the tube.

4. The method of claim 1, wherein a time period for said contacting step comprises less than about 10 seconds.

20 5. The method of claim 1, wherein the orifice has an aspect ratio of at least about 1.5:1.

25 6. The method of claim 5, wherein the aspect ratio comprises at least about 3:1.

7. The method of claim 1, wherein the forming tool comprises a thermal conductive material which will remove heat from the tube during said contacting step.

30 8. The method of claim 1, wherein the step of manipulating comprises at least one method selected from grinding, laser cutting, polishing, water jet cutting, picking, core drilling, and combinations thereof.

9. The method of claim 1, wherein the forming tool comprises a base portion comprised of a first material of construction and a second portion comprised of a second material of construction.

5 10. The method of claim 1, furthering comprising forming the crucible without annealing the crucible.

11. The method of claim 5, wherein the aspect ratio comprises at least about 6:1.

10 12. The method of claim 1, wherein the forming tool comprises at least one surface capable of venting an atmosphere inside the tube during said contacting.

13. The method of claim 12, wherein the surface comprises at least one passage through the forming tool.

14. The method of claim 1, further comprising drawing heat away from the tube.

15 15. The method of claim 1, further comprising venting an atmosphere in the tube away from the closed end.

20 16. The method of claim 1, wherein the orifice has at least one dimension as small as about 0.5 mm.

17. The method of claim 1, wherein said orifice comprises a substantially rectangular shape.

25 18. The method of claim 1, wherein said orifice comprises a substantially elliptical shape.

30 19. The method of claim 1, wherein said step of contacting comprises transitioning the closed end of the tube from substantially symmetrical about an axial centerline of the tube to substantially non-symmetrical about the axial centerline of the tube.

SEARCHED  
INDEXED  
SERIALIZED  
FILED

20. The method of claim 1, further comprising not heating the closed end during said contacting step.

21. The method of claim 1, further comprising pre-heating the forming tool to at 5 least about 300°C prior to said step of contacting.

22. The method of claim 1, wherein a material of construction of the forming tool comprises graphite, platinum, alloys of platinum, alumina, zirconia, ceramics, or combination thereof.

10 23. A glass crucible formed in accordance with claim 1.

24. The method of claim 1, wherein an inner diameter of the tube comprises no more than about 5% more than an outer diameter of the forming tool.

15 25. A method of forming a crucible comprising:

(a) bottoming one end of a tube thereby forming a substantially closed end;

(b) heating the closed end to a forming temperature;

(c) pre-heating a forming tool to at least about 300°C prior;

20 (d) contacting an interior surface of the closed end with a forming tool, thereby altering an interior surface of the closed end to form at least one section with a predetermined wall thickness;

(e) venting an atmosphere in the tube away from the closed end; and

(f) manipulating the at least one section of the closed end to form an orifice.

25 26. A method of forming a crucible comprising:

(a) bottoming one end of a tube thereby forming a substantially closed end;

(b) heating the closed end to a forming temperature;

30 (c) contacting an interior surface of the closed end with a forming tool having a non-circular tip, thereby altering the interior surface of the closed end to form at least one section with a predetermined wall thickness; and

(d) manipulating the tip of the closed end to form an orifice.

27. A method of making an optical fiber having a section with a non-circular cross section comprising drawing at least a section of a fiber from a crucible made in accordance with claim 1.

5

28. The method of claim 1 wherein the forming tool comprises a non-circular tip.

29. The method according to claim 1 wherein a shape of the orifice comprises a non-circular shape.

10

30. The method according to claim 1 wherein said contacting comprises rotating the tube and the forming tool, plunging the tool into the closed end of the tube while both the tube and the tool are not rotating, removing the tool from the closed end, and rotating the tube after said removing.

15

31. The method of claim 1 wherein said contacting comprises heating the at least one section of the closed end of the tube.

20

32. The method of claim 1 further comprising plunging a second forming tool with a nipple into the closed end prior to step (c).

33. A method of making an optical fiber having a section with a non-circular cross section comprising drawing at least a section of a cane from a crucible made in accordance with claim 1.